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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,704	10/23/2003	Max Shtein	10020/29701	9763
23838 7590 09/25/2007 KENYON & KENYON LLP 1500 K STREET N.W. SUITE 700 WASHINGTON, DC 20005			EXAMINER TUROCY, DAVID P	
			ART UNIT 1762	PAPER NUMBER
			MAIL DATE 09/25/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/690,704

Applicant(s)

SHTEIN ET AL.

Examiner

David Turocy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 8/13/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendments, filed 8/13/2007, have been fully considered and reviewed by the examiner. The examiner notes the amendment to independent claims, 1 and 11. Claims 1-20 remain pending in the instant application.

### ***Response to Arguments***

2. Applicant's arguments filed 8/13/2007 have been fully considered but they are not persuasive.

Applicant argues against the Schmidtt reference stating that the reference fails to disclose mixing the vapor of an organic material for deposition with a carrier gas and introducing the carrier gas carrying the organic material into the nozzle. The applicants allege that Schmidtt requires that reactive species precursor be introduced to the nozzle and that the precursor is then reacted and thus the organic material that enters is not deposited. Initially, the examiner notes that the organic material that enters the nozzle, whether reactive or not, does in fact become deposited on the substrate, which is contrary to the applicants allegations. While the organic material is deposited as a polymer and monomer as introduced into the system appears to be moot with regards to the claim as written because the monomer is in fact deposited on the substrate.

Even if the applicants content that the organic material entering the nozzle must not undergo any changes in properties prior to deposition, which is not necessarily required by the claim as written as discussed above, the examiner notes Schmidtt

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discloses varying alternatives. First Schmidtt discloses that the monomer polymerizes within the jet and it is the examiners position that atleast a portion of the monomers supplied will be deposited on the substrate, where the monomer will effectively be polymerized. Secondly, the examiner has noted previously that the opening (defined by 3-1) of Schmidtt can liberally be read on a nozzle (figure 3, 17-1, 17-2). Therefore, taking this interpretation, which is clearly reasonable in view of the claim and the specification, Schmidtt does in fact discloses supplying a organic material in a carrier gas to the nozzle (the path formed by walls 3-1 of figure 3 or the passage of figures 17-1 and 17-2). Thereafter the organic material that is supplied to the nozzle within a carrier gas, is ejected and deposited on the substrate, i.e. the organic material entering the orifice is identical in form and property to the organic material deposited..(see also figure 5).

In arguing against the Schmidtt reference, it appears as though the applicants are interpreting the term "nozzle" to narrowly, and the examiner maintains that such a term may encompass the passage formed by walls 3-1 of figure 3 or the passage of figures 17-1 and 17-2. Therefore the process as Schmidtt does in fact disclose the process of mixing the organic material with the carrier gas above the passage and thereafter introducing the combined flow into the "nozzle" and ejecting such onto the substrate. While the examiner notes that Schmidtt describes 1-1 as a nozzle, such a description does not preclude the passage as described above from being considered a nozzle, which as discussed above is in accordance with the claims and the specification.

Even in the event that the applicants contend the interpretation as above is erroneous, the examiner maintains that one of ordinary skill in the art would have reasonably expected to successfully provide an organic coating by mixing the reactive species and the organic material prior to entering the entire nozzle structure.

Additionally, the examiner would have reasonably expected to successfully deposit a monomer material, without polymerization using the jet deposition technique. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

As for the limitation requiring forming a patterned film comprising pixels, the examiner notes that the coating of Schmidtt reads on the claim limitation. The applicant argues that Schmidtt discloses covering the entire surface and therefore can not reasonably read on the claim as written. However, the examiner disagrees. The claim limitations as presented by the applicant are not patentably distinct from coating an entire surface. Specifically, the coating is a pattern and therefore is a patterned film and the pattern film will inherently comprise pixels. The applicant does not define the term pixel, or the scope of what is encompassed by the term pixel. Therefore while a coating over the entire surface of the substrate does not form distinct pixels, separate from each other, such is not required by the claim. The pixels will be overlapping or abutted, but nonetheless the film will comprise pixels.

Additionally, the examiner notes Figure 8 and Figure 12. Figure 12 discloses providing a patterned film on a substrate, wherein the each of the layers films (13-3) can

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be considered pixels, thus the pattern film comprises a plurality of pixels. Figure 8 discloses depositing a "pixel" on the surface of the substrate and therefore it is the examiners position that it would have been obvious to one of ordinary skill in the art to have deposited a plurality of pixels on the substrate with a reasonably expectation of successfully providing predictable results.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-3, 10, 14-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4788082 by Schmitt ("Schmitt") in view of "Angular

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Distribution of Flow from Orifices and Tubes at High Knudsen Numbers" by Stickney et al, hereafter Stickney.

Schmitt discloses a process for depositing a film using a carrier gas (Abstract). Schmitt also discloses ejecting a carrier gas, hydrogen or helium, where the flow velocity is on the order of the speed of sound of the carrier gas or about one kilometer per second, which is greater than 10% of the thermal velocity of the carrier gas (Column 19, lines 59-62). Schmitt discloses depositing organic molecules to form coatings, including polymeric coatings (Column 30, lines 21-38). Schmitt discloses depositing the organic material using an atmospheric background pressure, i.e. 760 Torr, which reads on the background pressures as claimed (Column 21, lines 31-47, Column 24, lines 49-64). It is the examiners position that spraying in an atmospheric pressure environment inherently results in a pressure between the substrate and the nozzle, applicants "dynamic pressure", as claimed. Schmitt also discloses that though high vacuum systems are often complicated they are often utilized when depositing thin films (Column 1, line 66 – Column 2, line 3). Schmitt also discloses providing a depositing species with a molecular weight greater than the carrier gas (Column 11, lines 48-58).

Schmitt fails to disclose providing a nozzle diameter, nozzle length or a nozzle-to-substrate separation about equal to the gas mean free path length.

However, Stickney, discloses the angular distribution of the flow through an orifice, when using vacuum technology, is directly related to the Knudsen number, which is defined as the mean free path / diameter of the orifice (Page 10). Stickney discloses

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the angular distribution of the flow through the orifice becomes increasingly narrow, i.e. more directed, and the center-line intensity increases (page 16). Therefore Stickney discloses the Knudsen number decreases to 1, the angular distribution narrows and the center line intensity increases. In addition, Stickney discloses angular distribution of the spray through a tubular member is a function of the length of the tube as well as the diameter of the tube (Page 16-18). Therefore Stickney clearly discloses the relationship between the orifice diameter and the mean free path of the gas is a result effective variable.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the Knudsen number, including a Knudsen number about 1, used in the process of Schmitt, through routine experimentation, to provide a spray through an orifice, when using vacuum technology, with the desired angular distribution.

As for the limitation require the, introducing an organic material with a carrier gas into a nozzle and depositing the organic material that is introduced into the nozzle on a substrate and the formation of the patterned film: The examiner incorporates by reference in its entirety the remarks from section 3 above.

6. Claims 4-5, 6, 9, and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and further in view of US Patent 6468605 by Shah et al. ("Shah").



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Schmitt in view Stickney teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt in view Stickney fails to teach providing a guard flow.

However, Shah teaches of a method for producing a high-speed jet of coating material and gaseous carrier gas (Abstract). Shah discloses providing a guard gas (24) from the nozzle surrounding the gaseous spray (Column 3, line 52-Column 4, line 6, Figure 1). Shah discloses the guard gas facilitates screening, directing, and shaping of the spray coating to provide the appropriate coating (Column 4, lines 1-2). Shah also discloses using a guard gas including argon and nitrogen (Column 4, lines 3-4). It is the examiners position that the guard gas flow, as disclosed by Shah, would inherently affect the "dynamic pressure" or the pressure between the nozzle and the substrate.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stickney to use the guard flow suggested by Shah to provide a desirable high speed spray coating because Schmitt in view Stickney teaches spraying, at high speeds, a coating material entrained in a carrier gas and Shah teaches providing a guard gas provides for shaping, directing, and screening of the coating material entrained in a carrier gas. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183).

Claim 9: Schmitt in view Stickney and further in view of Shah discloses using a guard gas, argon or nitrogen, which has a larger molecular weight than the carrier gas, hydrogen or helium.

7. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and Shah and further in view of Kirk-Othmer Vacuum Technology "Kirk-Othmer".

Schmitt in view Stickney and Shah teaches all the limitations of these claims as discussed above in the 35 USC 103 (a) rejection, however, Schmitt in view Stickney and Shah fails to explicitly teach providing a pressure less than 0.1 Torr.

However, Kirk-Othmer, teaching of known uses of vacuum technology, discloses a high vacuum corresponds to a controlled vacuum system (Pg 750, last paragraph). In addition, Kirk-Othmer discloses using various pressures, including pressures less than 0.1 Torr, for various controlled vacuum processes (Table 1). Therefore it is the examiners position that the pressure within the vacuum is a result effective variable, which varies depending on the coating material and substrate.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal pressure within the vacuum chamber, including less than 0.1 Torr, to deposit a thin film as disclosed by Schmitt in view Stickney and Shah, through routine experimentation, to provide the desired coating of a substrate under vacuum conditions.

8. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view Stickney and Shah and further in view of US Patent 5709906 by Bickford et al. ("Bickford").

Schmitt in view Stickney and Shah teach all the limitations of these claims as discussed in the 35 USC 103 (a) rejection above. In addition, Schmitt teaches purging the system using the inert carrier gas to remove any unwanted species in the system, which might have been there when left open to the ambient environment (Column 21, lines 31-40). However, Schmitt in view Stickney and Shah fails to teach using a glove box.

However, Bickford discloses using a chamber that either can be purged with an inert gas, using an inlet tube and one-way nozzle, or the operation can take place in a glove box under an inert atmosphere (Column 8, lines 53-56). The examiner acknowledges Bickford is directed to electrochemically reducing organic compounds, however, Bickford is only utilized here to show that an inert glove box is a known substitute for purging a chamber prior using a carrier gas. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Schmitt in view Stickney and Shah to use the glove box with an inert gas atmosphere suggested by Bickford to provide a desirable inert atmosphere without unwanted species because Schmitt in view Stickney and Shah teaches purging the

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spray chamber with inert gas prior to applying the coating and Bickford teaches a glove box with an inert atmosphere is a known substitute for inert gas purge of a chamber.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

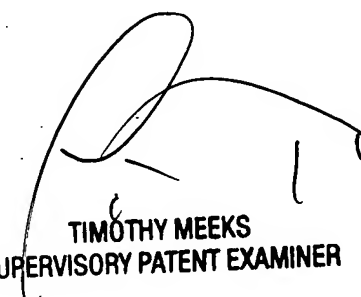
Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/  
Patent Examiner  
AU 1762



**TIMOTHY MEEKS**  
**SUPERVISORY PATENT EXAMINER**